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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,568	12/06/2001	Doron Orenstien	42390P10915	8585

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EXAMINER	
SUAREZ, FELIX E	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 01/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,568	ORENSTIEN ET AL.	
	Examiner	Art Unit	
	Felix E Suarez	2857	AW

-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment filled 03 Novembe 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-15,20-25 and 29-37* is/are allowed.

6)☒ Claim(s) *1,2,4,6,7,9,11,16,19 and 26* is/are rejected.

7)☒ Claim(s) *3,5,8,10,17,18,27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

1. Claims 1, 2, 4, 6, 7, 9, 11, 16 and 26 are rejected under 35 U.S.C. 102(a) as being unpatentable over Vanhoof et al. (U.S. Patent No. 6,212,566).

With respect to claim 1, Vanhoof et al. (hereafter Vanhoof) teaches an apparatus comprising:

a plurality of processing units (see col. 40, lines 23-49);

a monitor to obtain a plurality of monitor values from said plurality of processing units (see col. 40, lines 40-65), wherein said monitor is to transfer a process from a first processing unit of said plurality of processing units to a second processing unit of said plurality of processing units (see col. 19, lines 2-17 and col. 47, lines 14-49) in response to said plurality of monitor values (see col. 38, lines 51-66).

With respect to claim 2, Vanhoof further teaches said monitor is to transfer the process from plurality of monitor values being greater than a second one of said plurality of monitor values (see col. 39, lines 22-50) over a period of time (see col. 31, lines 38-65).

With respect to claim 4, Vanhoof further teaches each of said plurality of processing units is one of a set consisting of:

a core of a multi-core processor (see col. 3, lines 36-44; col. 40, lines 23-49 and col. 46, lines 25-51);

an execution unit of a processor (see col. 4, lines 57-67 col. 11 line 66 to col. 12 line 7);

a separate processor unit (see col. 9, lines 59-65).

With respect to claim 6, Vanhoof further teaches said monitor comprises:

an exchange module to exchange processes between ones of said plurality of processing units (see page col.13, lines 42-52).

With respect to claim 7, Vanhoof further teaches said monitor comprises:

a move module to move one process from one of said plurality of processing units to another one of said plurality of processing units that is idle (see col. 13, lines 53-67).

With respect to claim 9, Vanhoof further teaches comprising:

a cache coupled to said plurality of processing units, wherein said monitor is to swap processes between said first processing unit and said second processing unit by saving a first plurality of state variables from said first processing unit in said cache and saving a second plurality of state variables from said second processing unit in said cache and restoring said second plurality of state variables to said first processing unit from said cache and restoring said first plurality of state variables to said second processing unit from said cache (see col. 28, lines 64-67 and col. 31, lines 1-4).

With respect to claim 11, Vanhoof further teaches said first processing unit and said second processing unit are coupled to receive power from different power wells and are capable of being independently operated at different voltages and frequencies under control of the monitor (see col. 24, lines 36-42).

With respect to claim 16, Vanhoof teaches a system comprising:

a plurality of processing units, each processing unit to track its power consumption, and to support a process move procedure (see col. 18, lines 50-65 and col. 30, lines 41-53);

a monitor to receive monitor information from each of said plurality of processing units and to re-allocate processes to different ones of said plurality of

processing units in response to the monitor information received from the plurality of processing units (see col. 13, lines 12-41);

a memory coupled to said plurality of processing units to store instructions for execution by said plurality of processing units (see col. 11, lines 39-49 and col. 16, lines 35-47).

With respect to claim 26, Vanhoof teaches an apparatus comprising:

a plurality of processing units (see col. 9, lines 6-34);

a module to periodically transfer processes from a first processing unit from said plurality of processing units to a second processing unit from said plurality of processing units (see col. 31, lines 38-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vanhoof et al. (U.S. Patent No. 6,212,566) in view of Simar, Jr. et al. (U.S. Patent No. 6,182,203).

With respect to claim 19, Vanhoof et al. (hereafter Vanhoof) further teaches said monitor comprises:

an exchange module to exchange processes between ones of said plurality of processing units (see col. 13, lines 53-67);

a move module to move one process from one of said plurality of processing units to another one of said plurality of processing units that is idle (see col. 13, lines 53-67).

Vanhoof does not teach:

a sum module to throttle processing of one or more of said plurality of processing units if a sum total of power consumption of said plurality of processing units exceeds a selected total power consumption metric; nor

a shutdown module to shut down one or more of said plurality of processing units in a low power mode.

But Simar teaches the features of the Digital Signal Processor (DSP) includes an advanced very long instruction word (VLIW) CPU with eight functional units including two multipliers and six arithmetic units.

Includes an instruction packing to reduce code size, program fetches, and power consumption (see Simar, col. 86, lines 26-45).

Simar also teaches in a Power-Down Modes, if the power-down mode state is terminated by an enable interrupt, the DSP will enter the interrupt service routine on wake-up and then return to the instruction after the power-down instruction (see Simar, col. 84, lines 4-13).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Vanhoof to include the features of the DSP as taught by Simar, because ones of the features of the DSP is to process arithmetic functions and the interrupt service routine in the power-down mode.

Response to Arguments

3. This action is responsive to papers filed 11/03/03.

4. Applicant's arguments filed 11/03/03 have been fully considered but they are not persuasive respect to claims 1, 2, 4, 6, 7, 9, 11, 16, 19 and 26. The Examiner has thoroughly reviewed applicant arguments, but believes the cited references to reasonably and properly meet the claimed limitations.

The indicated claims 1, 2, 4, 6, 7, 9, 11, 16, 19 and 26 are rejected in view of the newly discovered reference(s) to Vanhoff et al. (U.S. Patent No. 6,212,566).

Allowable Subject Matter

5. Claims 3, 5, 8, 10, 17, 18, 27 and 28, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 12-15, 20-25 and 29-37 are allowable.

7. The following is a statement of reasons for the indication of allowable subject matter:

Claims 12-15, 20-25 and 29-37 are allowable because the prior art, particularly Vanhoodf et al. [U.S. Patent No. 6,212,566] (hereafter Vanhoof), Simar, Jr. et al. [U.S. Patent No. 6,182,203] (hereafter Simar) fails to teach or suggest an apparatus comprising:

monitor to monitor temperature and/or power consumption of said first core and said second core, and, in response to a selected metric being reached by one of said first core and said second core, to trigger storage of said plurality of first core state variables and said plurality of second core state variables in said cache and restoring of said plurality of second core state variables to said first core and restoring of said plurality of first core state variables to said second core.

Vanhoof and Simar also fail to teach or suggest a method (or machine readable medium) comprising:

swapping processes between said plurality of processing units in response to monitoring power consumption (or temperature) of said plurality of processing units.

Conclusion

Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fernandez et al. (U.S. Patent Application Publication No. 2001/0022615) describes monitoring parameters in a microprocessor.

Senyk [U.S. Patent No 6,363,490] describes a processor having a processing core integrated with a temperature sensing diode.

Mishigaki [U.S. Patent No 6,463,396] describes a one-chip controller capable to recognize a change in temperature in a chip.

Nizar et al. [U.S. Patent No 6,470,238] describes a control device temperature.

Thomas et al. [U.S. Patent No 6,487,668] describes a power management for a computer device.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Felix Suarez, whose telephone number is (703) 308-4926. The examiner can normally be reached on weekdays from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on (703) 308-1677. The fax phone numbers for the organization where this application or proceeding is assigned

are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

January 9, 2004

F.S.

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800